ABSTRACT OF THE DISCLOSURE

A method for filling recessed microstructures at a surface of a microelectronic workpiece, such as a semiconductor wafer, with metallization is set forth. In accordance with the method, a metal layer is deposited into the microstructures with a process, such as an electroplating process, that generates metal grains that are sufficiently small so as to substantially fill the recessed microstructures. The deposited metal is subsequently subjected to an annealing process at a temperature below about 100 degrees Celsius, and may even take place at ambient room temperature to allow grain growth which provides optimal electrical properties. Various novel apparatus for executing unique annealing processes are also set forth.